

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
15 January 2004 (15.01.2004)

PCT

(10) International Publication Number
WO 2004/005523 A1

(51) International Patent Classification⁷: C12N 15/861.
A61K 39/12, C12N 15/86

(21) International Application Number:
PCT/GB2003/002909

(22) International Filing Date: 4 July 2003 (04.07.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0215621.4 5 July 2002 (05.07.2002) GB

(71) Applicant (for all designated States except US): IM-
PERIAL COLLEGE INNOVATIONS LIMITED
[GB/GB]; Sheffield Building, London SW7 2AZ (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): SMITH, Geoffrey,
Lilley [GB/GB]; c/o Department of Virology, Faculty of

Medicine, Imperial College London, St Mary's Campus,
Norfolk Place, London W2 1PG (GB). MOORE, Jeffrey,
Bernard [CA/US]; 11 John Street, Brookline, MA 02466
(US). READING, Patrick, Clarke [AU/AU]; c/o Depart-
ment of Microbiology and Immunology, University of Mel-
bourne, Melbourne, Victoria 3010 (AU).

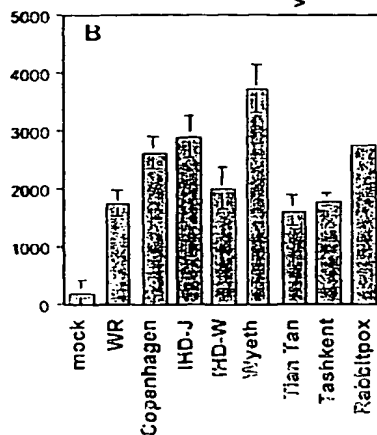
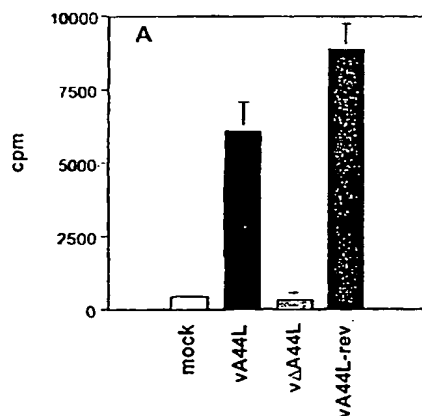
(74) Agents: SILVESTON, Judith et al.; Abel & Imray, 20
Red Lion Street, London WC1R 4PQ (GB).

(81) Designated States (national): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD,
SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG,
US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW).

[Continued on next page]

(54) Title: RECOMBINANT POXVIRUS NOT HAVING A FUNCTIONAL 3BETA-HSD GENE



(57) Abstract: A recombinant poxvirus, wherein the poxvirus genome does not comprise a functional gene encoding a 3 β -hydroxysteroid dehydroge-
nase/ Δ^5 - Δ^4 isomerase, may be used for vaccination against infection by a
poxvirus. The recombinant poxvirus in which, additionally, the poxvirus genome
comprises a non-poxvirus gene or a fragment of a non-poxvirus gene which
gene or fragment encodes an antigen, for example, of a pathogenic agent, may
be used to induce an immune response against the antigen, for example, for
vaccination against infection by the pathogenic agent.



Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

— with international search report

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 03/02909

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N15/861 A61K39/12 C12N15/86

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12N A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

BIOSIS, EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	SROLLER V, KUTINOVA L, NEMECKOVA S, SIMONOVA V, VONKA V.: "Effect of 3-beta-hydroxysteroid dehydrogenase gene deletion on virulence and immunogenicity of different vaccinia viruses and their recombinants." ARCH VIROL. 1998;143(7):1311-20., vol. 143, no. 7, 1998, pages 1311-1320, XP002254066	1-18,20, 22-50
Y	cited in the application the whole document --- -/--	1-50



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

10 September 2003

Date of mailing of the international search report

13/10/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Chambonnet, F

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/GB 03/02909

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	MOORE JB, SMITH GL.: "Steroid hormone synthesis by a vaccinia enzyme: a new type of virus virulence factor." EMBO J., vol. 11, no. 5, May 1992 (1992-05), pages 1973-1980, XP002254067 cited in the application the whole document	1,3-7
Y	WO 92 15672 A (VIROGENETICS CORP) 17 September 1992 (1992-09-17) claims 1-6,14,35,36,59,60,62-65	1-50
Y	SKINNER MA, MOORE JB, BINNS MM, SMITH GL, BOURSNEILL ME: "Deletion of fowlpox virus homologues of vaccinia virus genes between the 3beta-hydroxysteroid dehydrogenase (A44L) and DNA ligase (A50R) genes." J GEN VIROL., vol. 75, no. pt 5, September 1994 (1994-09), pages 2495-2498, XP002254068 the whole document	1,14, 19-21
P,X	READING PC, MOORE JB, SMITH GL: "Steroid hormone synthesis by vaccinia virus suppresses the inflammatory response to infection." J EXP MED., vol. 197, no. 10, 19 May 2003 (2003-05-19), pages 1269-1278, XP002254069 the whole document	1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB 03/02909

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

Although claims 26 and 47 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the composition.
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 03/02909

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9215672	A	17-09-1992	
		AT 247163 T	15-08-2003
		AU 701599 B2	04-02-1999
		AU 1001197 A	15-05-1997
		AU 701781 B2	04-02-1999
		AU 1001297 A	15-05-1997
		AU 672359 B2	03-10-1996
		AU 1587192 A	06-10-1992
		AU 699903 B2	17-12-1998
		AU 6051396 A	24-10-1996
		CA 2105277 A1	08-09-1992
		EP 0575491 A1	29-12-1993
		JP 6505874 T	07-07-1994
		KR 242671 B1	02-03-2000
		KR 263278 B1	15-07-2000
		KR 263279 B1	15-07-2000
		US 5364773 A	15-11-1994
		US 5503834 A	02-04-1996
		US 6267965 B1	31-07-2001
		WO 9215672 A1	17-09-1992
		US 5494807 A	27-02-1996
		US 6596279 B1	22-07-2003
		US 5833975 A	10-11-1998
		US 5759552 A	02-06-1998
		US 5756102 A	26-05-1998
		US 5766597 A	16-06-1998
		US 5641490 A	24-06-1997
		US 5766598 A	16-06-1998
		US 5863542 A	26-01-1999
		US 5756103 A	26-05-1998
		US 5766599 A	16-06-1998
		US 5942235 A	24-08-1999
		US 6265189 B1	24-07-2001
		US 5989561 A	23-11-1999
		US 5759553 A	02-06-1998
		US 5744141 A	28-04-1998
		US 5843456 A	01-12-1998
		US 5759841 A	02-06-1998
		US 6537594 B1	25-03-2003
		US 5997878 A	07-12-1999
		US 5762938 A	09-06-1998
		US 5514375 A	07-05-1996
		US 2003064077 A1	03-04-2003
		US 2003082204 A1	01-05-2003